

## CLAIMS

1.

1. A sprinkler, comprising:

an outer housing having a lower end connectable to a source of pressurized water;  
a riser vertically reciprocable along a vertical axis within the outer housing between extended and retracted positions when the source of pressurized water is turned ON and OFF;  
a nozzle mounted at an upper end of the riser for rotation about the vertical axis;  
a turbine mounted inside the riser for rotation about a horizontal axis; and  
a drive mechanism connecting the turbine to the nozzle so that when the source of pressurized water is turned ON the resulting rotation of the turbine by the pressurized water will rotate the nozzle.

2. The sprinkler of Claim 1 wherein the drive mechanism includes a reversing mechanism for causing the nozzle to rotate between a pair of arc limits.

3. The sprinkler of Claim 1 and further comprising a mechanism that allows a least one of the arc limits to be adjusted.

4. The sprinkler of Claim 1 wherein the turbine is a Pelton turbine.

5. The sprinkler of Claim 1 wherein the turbine and a drive mechanism that connects the turbine to the nozzle are mounted inside a pair of clam-shell case members inside the riser.

6. The sprinkler of Claim 5 wherein the drive mechanism includes a gear train reduction including a plurality of gears that rotate about a plurality of corresponding horizontal axes.

7. The sprinkler of Claim 5 wherein at least one of the case members defines a water inlet.

8. The sprinkler of Claim 1 and further comprising a manually adjustable stator for  
varying a rotational speed of the turbine.

9. The sprinkler of Claim 1 and further comprising a first filter for straining all water  
flowing into the lower end of the outer housing and a second filter for straining a portion of the water  
flowing past the turbine.

10. The sprinkler of Claim 5 wherein the drive mechanism includes a reversing mechanism  
mounted inside the claim-shell case members that causes the nozzle to rotate between a pair of arc  
limits.

✓ 11. A sprinkler, comprising:  
an outer housing having a lower end connectable to a source of pressurized water;  
a riser vertically reciprocable along a vertical axis within the outer housing between extended  
and retracted positions when the source of pressurized water is turned ON and OFF;  
a nozzle mounted at an upper end of the riser for rotation about the vertical axis;  
a plurality of mating case members dimensioned to fit inside the riser;  
a turbine mounted inside the case members; and  
a drive mechanism mounted inside the case members that connects the turbine to the nozzle  
so that when the source of pressurized water is turned ON the resulting rotation of the turbine by the  
pressurized water will rotate the nozzle.

12. The sprinkler of Claim 11 wherein the drive mechanism includes a reversing  
mechanism for causing the nozzle to rotate between a pair of arc limits.

13. The sprinkler of Claim 11 and further comprising a mechanism that allows a least one  
of the arc limits to be adjusted.

14. The sprinkler of Claim 11 wherein the turbine is a Pelton turbine.

15. The sprinkler of Claim 11 wherein the turbine rotates about a horizontal axis.

16. The sprinkler of Claim 11 wherein the drive mechanism includes a gear train reduction including a plurality of gears that rotate about a plurality of corresponding horizontal axes.

17. The sprinkler of Claim 11 wherein at least one of the case members defines a water inlet.

18. The sprinkler of Claim 11 and further comprising a manually adjustable stator for varying a rotational speed of the turbine.

19. The sprinkler of Claim 11 and further comprising a first filter for straining all water flowing into the lower end of the outer housing and a second filter for straining a portion of the water flowing past the turbine.

✓ 20. A sprinkler, comprising:  
an outer housing having a lower end connectable to a source of pressurized water;  
a riser vertically reciprocable along a vertical axis within the outer housing between extended and retracted positions when the source of pressurized water is turned ON and OFF;  
a nozzle mounted at an upper end of the riser for rotation about the vertical axis;  
a plurality of mating case members dimensioned to fit inside the riser, at least one of the case members defining a water inlet and a water outlet;  
a turbine mounted inside the case members receiving water passing through the inlet for powered rotation about a first horizontal axis;  
a drive mechanism mounted inside the case members that connects the turbine to the nozzle so that when the source of pressurized water is turned ON the resulting rotation of the turbine by the pressurized water will rotate the nozzle, the drive mechanism including a gear train reduction having

14 a plurality of gears that rotate about a plurality of corresponding second horizontal axes and a  
reversing mechanism for causing the nozzle to rotate between a pair of arc limits; and  
a manually adjustable stator for varying a rotational speed of the turbine.

2 / 21. A sprinkler, comprising:  
an outer housing having a lower end connectable to a source of pressurized water;  
a riser vertically reciprocable along a vertical axis within the outer housing between extended  
4 and retracted positions when the source of pressurized water is turned ON and OFF;  
a nozzle mounted at an upper end of the riser for rotation about the vertical axis; and  
6 a self-contained drive subassembly mounted inside the riser and including a turbine and a drive  
mechanism that connects the turbine to the nozzle so that when the source of pressurized water is  
8 turned ON the resulting rotation of the turbine by the pressurized water will rotate the nozzle.

2 22. The sprinkler of Claim 21 wherein the drive mechanism includes a reversing  
mechanism for causing the nozzle to rotate between a pair of arc limits.

2 23. The sprinkler of Claim 21 wherein the drive subassembly is configured so that only  
a portion of the water flowing into the riser drives the turbine.

24. The sprinkler of Claim 21 wherein the turbine is a Pelton turbine.

25. The sprinkler of Claim 21 wherein the turbine rotates about a horizontal axis.

2 26. The sprinkler of Claim 21 wherein the drive mechanism includes a gear train reduction  
including a plurality of gears that rotate about a plurality of corresponding horizontal axes.

2 27. The sprinkler of Claim 23 and further comprising a first screen for filtering the portion  
of the water flowing into the riser that drives the turbine, and a second screen for filtering a second

portion representing a remainder of the water flowing into the riser, the first screen having a finer  
4 mesh size than the second screen.

28. The sprinkler of Claim 21 and further comprising a manually adjustable stator for  
2 varying a rotational speed of the turbine.

29. The sprinkler of Claim 21 wherein the drive subassembly includes a pair of mating case  
2 members that enclose the turbine and the drive mechanism.

30. The sprinkler of Claim 21 and further comprising a mechanism that allows a least one  
2 of the arc limits to be adjusted.

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